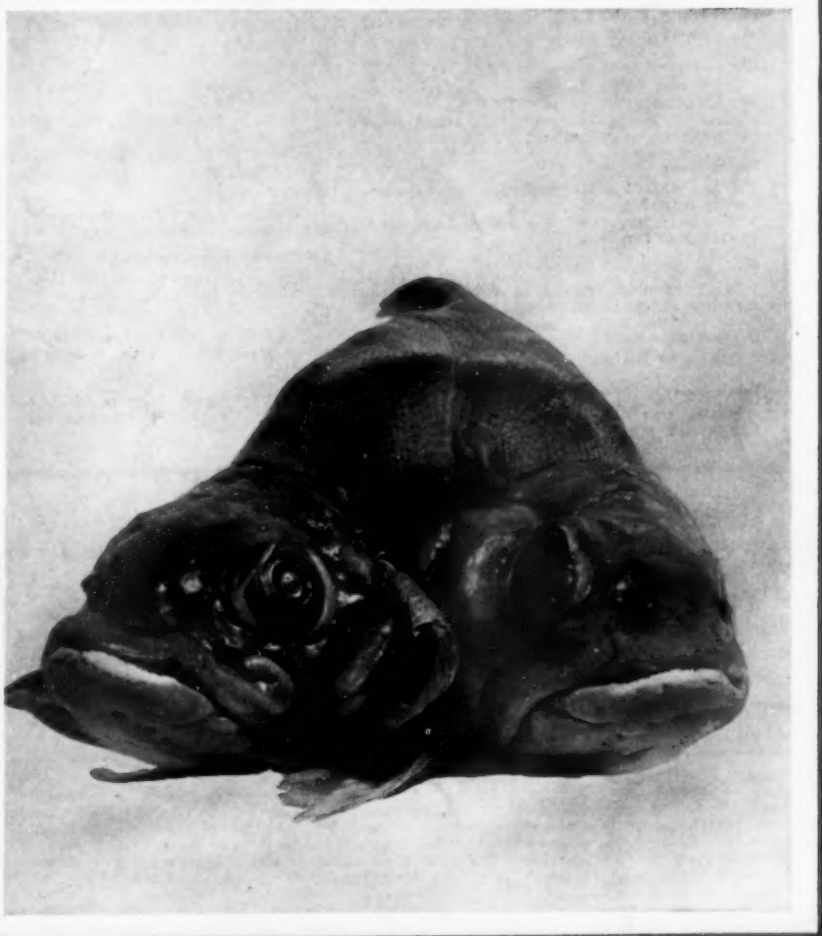
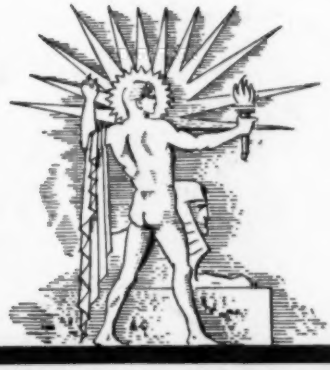
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





February 10, 1940

Cuthbert the Great

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A SCIENCE SERVICE PUBLICATION

Do You Know?

Special ear muffs are worn by welders to keep out sparks.

Winter weather in Finland lasts from four to six months.

A Frenchman invented the canning process, but a British firm was first to make practical use of it.

There is more unexplored territory in Brazil, says one army officer, than in all Africa.

Some war planes have as many as 75 instrument dials to be made luminous by radium salts.

Two railroad cars equipped for mine-rescue work are operated by the U. S. Bureau of Mines.

Grazing cattle shun buttercups because of the acrid juices, which are poisonous; but fodder containing dried buttercups lacks these juices.

Television has produced a new make-up, with light tan base, white highlights on eye and neck hollows, blue powder, and bluish-red lipstick.

Some states have reserved streams and ponds for exclusive use of women anglers, and Connecticut has a woman fish warden who does teaching duty.

England is investigating ways of recovering bones from home kitchens, since tons of bones are ordinarily imported each year for use in glue, gelatins, and fertilizer.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

Agriculture

How did plant breeders obtain a new drought-resistant forage crop? p. 88.

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Archaeology

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Public Health—Psychology

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Radio

For what sort of service will FM be given more room on the radio bands? p. 89.

Zoology

What strange bathers will occupy the swimming pool of a former luxury liner? p. 89.

Australia reports success in recent efforts to promote a flax fiber industry.

Waste paper—even that from the workmen's lunches—is converted into backing board by one automobile manufacturing company, which has its own paper plant.

All but one per cent of the world's jute, source of burlap for millions of sandbags, comes from India.

The United States Housing Authority hopes to lower prices of its houses to buyers by reducing the number of window sizes.

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PHYSICS

New Theory of Relativity Devised by M.I.T. Scientist

Makes Space Flat Instead of Curved and Explains Long-Mystifying Ether Drift Experiments of Miller

THE HEADS of the much-mentioned ten men who understand Prof. Einstein's theory of relativity, and physicists generally throughout the world, will soon be buzzing with a new and improved theory of relativity developed by a young scientist at Massachusetts Institute of Technology, Dr. N. Rosen.

Dr. Rosen, at one time assistant to Prof. Einstein at Princeton, has put into the intricate equations of relativity an additional element which corresponds to flat space. This flat space is superimposed on the curved space of standard Einstein relativity.

The new theory, which takes three separate scientific reports (*Physical Review,* Jan. 15) shows that calculations based on a flat kind of space found in school-boy Euclidian geometry have no "internal contradictions."

While the new theory is relativity, all right, it "involves less relativity" than Einstein's, to quote Dr. Rosen. Moreover, by doing the calculations in the new fashion of the young scientist the same crucial predicitions of relativity—on whose confirmation has been based acceptance of the Einstein theory—are likewise achieved.

What may well become an important advance of the new Rosen relativity is that it appears to give an explanation of the long-baffling results of Prof. D. C. Miller, reporting a measurement of the motion of the earth through a hypothetical ether.

Even before Einstein's theory famous scientists like Prof. Albert Michelson had attempted without success to detect this "ether drift," as it was called. When Prof. Einstein developed his relativity theory he gave a reasonable—and now accepted—explanation of why Michelson obtained a negative result.

But Prof. Miller, at the Case School of Applied Science at Cleveland, for years continued the original "ether drift" experiments and, using extreme care and every precaution and refinement of research, finally came to the conclusion that a small motion of the earth with respect to a hypothetical ether could really be measured.

Prof. Miller's results have won scant acceptance in the face of Einstein's relativity but his world-wide reputation as a most careful scientist, and the tremendous mass of data which he obtained over a period of many years, have always made his results a great question mark in the face of scientific knowledge. If Dr. Rosen with his new theory can do no more than interpret Prof. Miller's results—as he claims he can—then the work of the young M.I.T. scientist will be outstanding.

The reason Prof. Miller appears to obtain evidence of a motion of the earth and a "drag" as it drifts, says the new Rosen theory, is that "a static gravitational field provides a frame of reference with respect to which the uniform motion of an observer can be determined by experiments on light performed within his own system." The Einstein theory in its original form does not permit such a possibility.

In the new Rosen relativity theory par-

PHYSICS

Neutrino Has No Weight at All Yet Can Carry Off Energy

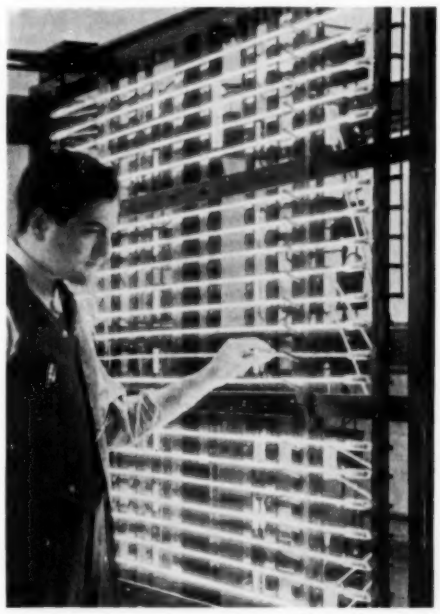
DISCOVERY that the neutrino, science's most elusive atomic particle, in all probability has no weight whatever when at rest has resulted from the first important experiments with the Westinghouse giant 4,000,000-volt atom smasher, in research by Dr. E. U. Condon and his associates.

The very existence of the neutrino has been considered doubtful. The new experiments show its reality, and they make probable that it actually weighs nothing, yet does carry away energy when moving rapidly. Paradoxical as it may sound, a very high velocity of a massless particle will give it energy.

The measurements show that any mass that the neutrino may have is certainly less than 7% of the mass of the electron, the fundamental particle of negative electricity. The neutrino, like its big brother the neutron, has no electrical charge.

The determination of the neutrino's lack of mass was made by finding the least energy with which carbon atoms have to be struck by protons in order to knock out neutrons. The result of such a transmutation is to give radioactive nitrogen. By combining the new data with other energies already measured for nitrogen, it is possible to tell that the neutrino has extremely little or no mass.

Associated with Dr. Condon in the experiments were Dr. W. H. Wells, who designed the large generator, and Drs. W. E. Shoupp, R. O. Haxby and W. E. Stephens, who carried out many of the experiments.



NEON TUBE TEST

At the National Bureau of Standards, A. Bernstein is cautiously examining a tube that has burned out. The new fluorescent lighting tubes may be tested for length of life in this same way.

ticles and light rays behave otherwise just as they do in standard Einstein theory.

A final advance of the new Rosen theory is that it gives tensor characteristics to quantities which, in Einstein, are only pseudo-tensors. A tensor, in mathematics, is a quantity which behaves like a collection of what scientists call vectors. A vector is a quantity which possesses both magnitude and direction. Velocity is a common vector. Tensors, in contrast to vectors, require more than three components for their designation.

Science News Letter, February 10, 1940

MEDICINE

Vitamin Treatment Cures Blinding Eye Disease

Keratitis, Disorder of the Cornea Hitherto Hopeless, Is Also Prevented by Riboflavin, Part of Vitamin B

THOUSANDS now blind or threatened by blindness due to an eye disease, keratitis, will have a chance to regain or preserve their sight because of the discovery that riboflavin, one of the vitamins formerly lumped together under the label B, will both prevent and cure the disease.

This latest vitamin therapy discovery, made at the University of Georgia, is announced through the U. S. Public Health Service. (*Public Health Reports*, Jan. 26)

Lack of riboflavin vitamin in the diet is proved to be the cause of the eye disease. In the first clinical trials, eleven patients were cured of the disease by doses of riboflavin, with improvement beginning within a few days.

Pathetic little babies born with syphilis, formerly thought to be a cause of the eye disease, can now have their eyes cured.

Discovery of the cause and cure of keratitis, which has long baffled ophthalmologists, was made by Drs. H. D. Kruse, of the Milbank Memorial Fund, New York, V. P. Sydenstricker, of the University of Georgia Medical School, W. H. Sebrell, of the U. S. Public Health Service, and H. M. Cleckley, of the University of Georgia Medical School. They also have found a way of detecting its earliest stages.

More Blood Vessels

Keratitis is a disorder of the cornea of the eye. The cornea is a delicate tissue in front of the eye whose main function is the transmission of light. Ordinarily it has almost no blood vessels in it. In keratitis, however, more blood vessels grow into the cornea, and later white opaque spots appear. If these occur in the line of vision, eyesight is blurred. If the condition grows worse, blindness results. Itching, burning, and pain when light falls on the afflicted eye are among the symptoms of keratitis.

In the 11 patients, including two with syphilis, keratitis was cured by doses of riboflavin alone, Dr. Kruse and associates report. Improvement began within a few days. When the riboflavin treatment was stopped, the eye disorder returned. It was again promptly cured by more doses of the vitamin. Those whose vision had been badly impaired were able to see normally.

The two patients with syphilis, one congenital and one acquired, had been getting anti-syphilis treatment for months without any improvement of the eye trouble. The vitamin treatment alone, without simultaneous treatment of the syphilitic infection, brought about "remarkable improvement" of the eye condition.

May Not Be Diet

While lack of riboflavin is now seen to be the cause of keratitis, the lack may be due to many factors besides poor diet, the doctors explained. Chief dietary sources of the vitamin are liver, milk, eggs and vegetables. Patients may fail to get enough of the vitamin either because they do not eat enough of these foods or because they cannot absorb the vitamin from the foods. Impaired digestion may interfere with the vitamin absorption. Infection, such as syphilis, may also make it impossible for the body to get enough of the vitamin from food.

Clue to the discovery of the vitamin cure came from an earlier discovery of Dr. Sebrell and Dr. R. E. Butler, U. S. Public Health Service. They found that many patients believed to be suffering from pellagra, Dixie's hard-times disease, were also suffering from another condition. Nicotinic acid cured their pellagra, but left the shiny, reddened lips, cracked mouth corners and fatty deposits around the nose untouched. This condition, they found, could be cured by the vitamin, riboflavin. It could even be induced by putting patients on a diet lacking only this vitamin. Before this, no one had known that human beings needed riboflavin in their systems.

Soon Dr. Sydenstricker discovered another sign of riboflavin deficiency or lack: inflammation of the tongue, with a magenta-red color instead of the normal pink, or the scarlet of pellagra.

Next it was noticed that patients coming to the hospital with riboflavin deficiency (ariboflavinosis is its technical name) also had eye trouble which the doctors recognized as typical keratitis. Neither nicotinic acid nor any other vitamin cured this condition. Eye doctors had tried for years, unsuccessfully, to find a cure. But when the patients were given riboflavin for their sore mouths and tongues, their eyes also improved. Further trials — stopping the riboflavin and watching the eye trouble return, and the crucial trial of the vitamin in patients with syphilitic keratitis—convinced Dr. Kruse and his associates that riboflavin was the cure for this eye disorder.

Slit-Lamp Aided

Exact diagnosis and study of the eye disorder was made possible by examination with a slit-lamp, donated by the Milbank Memorial Fund. A pencil-point beam of light from the slit-lamp is directed across the eyes and the doctor looks into them through a microscope. This enables him to see the blood vessels and opaque spots in the cornea in keratitis. When the condition has been cured, tiny lines seen at this examination show where the blood vessels were. In the early stages of the disease this examination also shows them just beginning to appear.

Science News Letter, February 10, 1940

PHYSIOLOGY

Surface of Lung Is Equal To Land 31 Feet Square

THE entire surface of a normal lung is equivalent in area to a strip of land occupied by a house 31 feet square, W. H. Lehmberg, American Optical Company scientist, has figured. In 24 hours of normal respiration approximately 600,000 cubic inches of air are breathed, the equivalent of air contained in a room 7 by 7 by 7 feet.

Science News Letter, February 10, 1940

MEDICINE

Vitamin E Hailed as Possible Cure for Hopeless Disease

Hitherto Incurable Muscle Ill Aided by Wheat Germ; May Help in Infantile Paralysis and Locomotor Ataxia

VITAMIN E, known as the fertility vitamin from wheat germ, is being hailed in medical circles in London as a probable cure for hitherto hopeless diseases of muscle weakness and nerve degeneration.

It is also seen as a possible means of protecting children against infantile paralysis and adults against one horrible result of syphilitic infection, locomotor ataxia.

Striking results in treating more than a score of human patients suffering from incurable and even fatal muscle weakness and nerve degenerative diseases with vitamin E are reported by Dr. Franklin Bicknell, honorary physician to the Farringdon Dispensary in London. (*The Lancet,* Jan. 6.)

The vitamin should also be used to protect children against infantile paralysis, at least during epidemics, Dr. Bicknell declares, though his report does not include such use of the treatment. He believes that in children who have a diet rich in this vitamin the nerve and brain cells attacked by infantile paralysis virus will be more resistant.

Why Some Are Affected

Lack of this vitamin in the diet, apparently necessary for nerve and muscle health as well as for normal reproduction, may explain why some patients with syphilis later develop locomotor ataxia while others do not. Arrest of this painful, disabling condition may be possible with the vitamin treatment, Dr. Bicknell believes. He tried it, without success, in two cases, but the condition was too far advanced in these patients for the negative results to show what the vitamin treatment can do.

Locomotor ataxia, he believes, may be the result not of syphilitic infection alone but also of a deficiency of vitamin E causing a degeneration of nerve tracts already weakened by syphilis.

Muscular dystrophy, amyotrophic lateral sclerosis, peroneal muscular atrophy and amyotonia congenita are the muscle and nerve disorders for which Dr. Bicknell used the wheat germ or vitamin E treatment. Results of treatment in the muscle weakness condition were remarkable, every patient except one, even bedridden patients, showing improvement.

These patients, 15 of them children, are apparently the first humans to receive the new vitamin treatment, although the discoverer of the vitamin, Dr. Herbert M. Evans, of the University of California, reported success in vitamin E treatment of similar muscular weakness and wasting in animals.

Seldom Eaten

Vitamin E has been called the fertility vitamin because it is necessary for normal reproduction, but Dr. Bicknell suggests that the substance in wheat germ which produced striking improvement in his patients may be something other than the fertility vitamin. For this reason, suggested by animal studies, he used fresh dried whole wheat germ, one-half ounce twice daily, to treat patients, rather than the chemical, alpha tocopherol, which has been identified as the pure form of the anti-sterility vitamin.

"Our diet may in some cases be on the edge of a vitamin E deficiency," Dr. Bicknell charges, pointing out that the most important food source of this vitamin, wheat germ, "is to all intents and purposes never eaten" because it is removed from the wheat flour in ordinary milling processes. Other foods containing small amounts of the vitamin may lose it in the course of storage and preparation.

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PHYSIOLOGY

Fat Men Can Drink More Than Can Thin Men

GOOD NEWS, or perhaps it is bad news, for fat men: From Berkeley, Calif., comes the observation by Dr. Emil Bogen, National Safety Council committee member studying intoxication tests, that fat men can drink more than thin men under normal conditions. The reason is that intoxication is caused by concentration of alcohol in the blood stream; fat men usually have more blood than their thinner brothers engaged in alcoholic exercises.

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ANCIENT ART

A 20,000-year-old outdoor art gallery showing mammoths and other animals painted by Old Stone Age artists is the discovery of a Ukrainian Academy of Sciences expedition. Found on rocks by the Azov Sea in far southern Russia, the paintings are pronounced first of such antiquity detected in the USSR. This view appears to be a doe preceding a reindeer.

MEDICINE

New Chemical Treatment Relieves Meniere's Disease

A NEW chemical treatment that brings swift relief from acute attacks of Ménière's disease has been announced to the medical world by Drs. C. H. Sheldon and B. T. Horton, of the Mayo Clinic. (*Proceedings,* Mayo Clinic, Jan. 10.)

Ménière's disease, although probably unknown to the majority of laymen, is frightfully distressing to those afflicted with it.

"Recurrent attacks of sudden severe vertigo (dizziness), nausea and vomiting, tinnitus (ringing in the ears) and deafness" is the description given by the Mayo Clinic physicians and other authorities. The attacks may come at shorter and shorter intervals and in severe cases the patient may be confined to his bed.

The chemical, histamine, is used in the new treatment developed at the Mayo Clinic. Histamine acid phosphate dissolved in salt solution is injected into a vein, the injection taking about one and one-half hours.

"The first patient so treated, who had been confined to bed for a period of three weeks because of Ménière's disease, was promptly relieved of all symptoms and was able to get up immediately after the injection was stopped and walk about in a perfectly normal manner," Drs. Sheldon and Horton report. This patient has remained well since the treatment, a period of about two months. Similar good results were obtained in 14 other cases.

A brain operation in which the nerve of hearing on the affected side is cut has been a successful, if drastic, method of relieving the condition completely. Medical treatment using ammonium chloride and a low salt diet has also been reported to give good results. But the "almost immediate response to treatment with histamine makes this method particularly valuable when the vertigo is of great violence and the vomiting severe," Dr. H. W. Woltman, of the Mayo Clinic, points out.

Science News Letter, February 10, 1940

CHEMISTRY

Chemically Speaking, Things Are Different Now

CHEMICALLY speaking, things are different from what they were some 25 years ago at the outbreak of war. As reviewed by *Industrial and Engineering Chemistry,* (December) journal of the American Chemical Society:

Potash. Deep deposits in the Southwest are mined, in addition to other sources, whereas manufacturers went to great lengths, and paid pretty prices to secure potassium in some form. Cottrell precipitators stripped it in dust from cement mills. It was extracted from Trona Lake. Kelp harvesters put to sea. Residues from sugar refineries were conserved and worked.

Acetone. The fermentation process was developed in World War days. It is still available and in addition we have synthetic acetone of high grade and reasonable cost.

Glycerol. More commonly called glycerine, it is now also made synthetically. We are not so largely dependent upon the by-product of soap manufacture.

Fixed nitrogen. Synthetic methanol (methyl or wood alcohol) and ethanol (ethyl alcohol) were chemical marvels then, commonplace today.

Rubber. Synthetic rubber-like materials are produced on a large scale now. At a chemical congress just before the World War, Germany's synthetic rubber-like substitute was a prize exhibit.

Camphor. It soared in price. The monopoly has long since been broken. Synthesis from turpentine produces not only a commercial but a U.S.P. grade.

Iodine is now obtained from our own brines and bitterns with Chile's monopoly broken.

Petroleum. The industry produces fuels and lubricants practically to order. Isooctane has come out of the laboratory into large-scale commercial production. The technique of making a 150-octane fuel is already known, promising new wonders in aviation.

In producing *drugs, dyes, perfumes,* what is known as the synthetic organic chemical industry, America is quite self-sufficient in contrast to almost helplessness a quarter of a century ago. "It stands almost alone as the one benefit the United States derived from the World War."

(*See also page 93.*)

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FORESTRY

Naval Stores Production Presents Surplus Problem

ROSIN, turpentine and allied products —the "naval stores" of commerce— present American forest products industry with a problem of surplus disposal, instead of the depletion and gradual extinction of the business which was anticipated as recently as 20 years ago. At the meeting of the American Forestry Association in Biloxi, Miss., Jay Ward of the U. S. Forest Service told some of the reasons why.

Failure of the naval stores industry to die out according to prediction has been due in large measure to the rapid development of second-growth pine timber and its unexpectedly high value as a turpentine and gum source, Mr. Ward stated. Piling up of business-spoiling surpluses is due at least in part to overeagerness of timber owners to work their trees for turpentine.

Part of a marketing agreement which was hailed at the time as promising a real new deal for Southern pine forests was a clause limiting the working of trees to those with diameters of more than nine inches. This clause was not at all well enforced, yet it has had an educative effect, and voluntary observation has now reduced the percentage of subsized trees being worked from an original 30% to only 5% or 6%.

Even with the improvements that have been made, however, there is still room for many more. Mr. Ward pointed out the record of some French pines, almost unbelievable in this country, that have been yielding regular yearly crops of turpentine for a century and a quarter. While it may not be possible to equal this record under American conditions, a slightly closer approach to it would greatly increase the efficiency of American pine woods as sources of naval stores.

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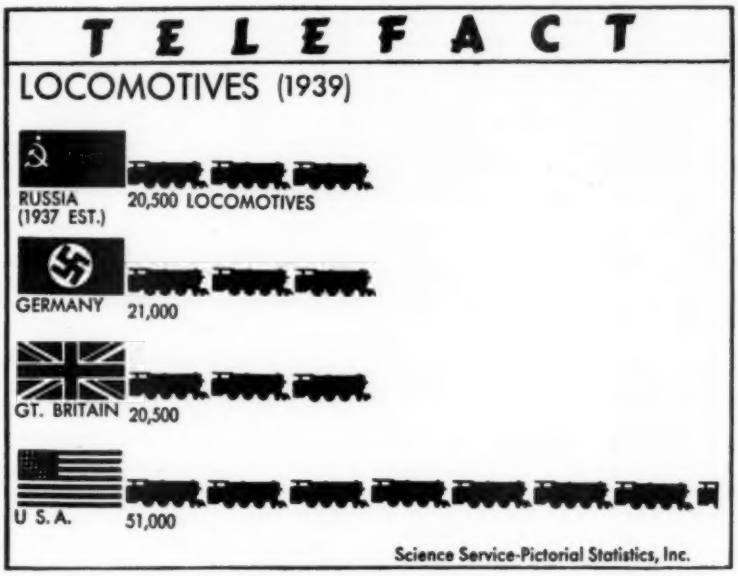

PHYSICS

Long-Sought Chain Reaction In Fission of Uranium Found

Discovery Is Essential Missing Link Leading Toward Possibility of Liberating Energy of the Atom

THE LONG-SOUGHT "chain" reaction in uranium fission, in which one uranium atom splitting sets off the fission of another, and so on with each releasing atomic energy in large amounts, is reported by four French scientists.

If science is ever to create a source of atomic power by the liberation of atomic energy in uranium splitting with low-energy neutral particles (neutrons), then chain reactions will be needed to make the fission self-perpetuating.

Ever since the first reports of uranium's splitting, a little over a year ago, scientists have searched in vain for the crucial chain reaction. It has remained for Dr. H. von Halban, Jr., Prof. F. Joliot, a Nobel Prize winner, Dr. L. Kowarski and Prof. E. Perrin of Paris to find the chain effect. (*Journal de Physique et le Radium,* October) They report that the chain effect is convergent, gradually weakening and coming to an end.

This result, at first sight discouraging for those who have envisioned atomic power, is only for the particular geometry of the experiment they have performed. Whether it would also be true for other experimental arrangements is not known. Perhaps it could be improved.

During the year of feverish research on uranium splitting which has now elapsed, the number of neutrons liberated by each uranium fission (without chain reactions) has been measured in both Europe and America. It comes out that between 2 and 3.5 neutrons, on the average, are liberated per fission. The test of a chain reaction is to compare this number of neutrons (without chain reactions) with the number of neutrons produced by fissions plus chain reactions.

This the French scientists have done, and they find that eight neutrons are liberated per primary uranium fission, whereas previously they had reported only 3.5 neutrons per fission. The difference, they conclude, is the evidence for the long-sought chain reaction and due to secondary and tertiary effects in the chain.

As a basic source of neutrons the French scientists used a mixture of 160 grams of beryllium mixed with one gram of radium. They allowed neutrons created by this source to bombard 300 kilograms (661 pounds) of uranium oxide contained in a copper sphere 50 centimeters in diameter. The copper sphere itself was immersed in a tank of water.

To detect the neutrons present they used detectors of dysprosium placed inside the copper sphere and in the surrounding water. The radioactivity produced on these detectors gave them a measure of the number of neutrons present in various parts of the system.

Goal of uranium fission experiments, from the practical standpoint, has been to produce a chain effect, which would liberate atomic energy (175,000,000 electron volts per fission) and yet remain under control. The fact that the new French experiments are convergent, gradually dying out, may mean one of two things. Either the energy liberation by the chain reaction is difficult to achieve and keep going, or that the scientists intentionally used an experiment which would give a convergent and thus be safe to carry out.

The new results are reported in the French scientific publication, *Journal de Physique et le Radium.*

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CHEMISTRY—AGRICULTURE

New, Cheaper Disinfectants For Hoof-and-Mouth Virus

NEW disinfectant treatments for ridding imported hides of the virus of dangerous hoof-and-mouth disease, developed in joint research by scientists of the U. S. Department of Agriculture and the University of Cincinnati, have been officially approved for use by the Bureau of Animal Industry. Because of their greater effectiveness and lower cost, it is expected that they will be widely employed.

The new treatments consist of immersing the hides for 24 hours or more in a 1-to-10,000 solution of sodium bifluoride, or in a 1-to-7500 solution of sodium silicofluoride. The disinfectant treatments hitherto in use have depended mainly on corrosive sublimate, which is many times more expensive, and also has a deleterious effect on the hides.

The research work was done by Dr. Adolph Eichorn, director of the Animal Disease Station of the Bureau of Animal Industry, situated at Beltsville, Md., and by Dr. Fred O'Flaherty, director, and E. E. Doherty, bacteriologist, of the leather research laboratory maintained at the University of Cincinnati by the Tanners' Council of America.

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AGRICULTURE

Colchicine Used To Create New Perennial Forage Crop

A NEW perennial forage crop that will flourish in Canada's western drought areas is expected to result from research at the Canadian National Research Council's Ottawa laboratories.

A sterile hybrid between wheats and wheat grasses was made into a vigorous, fertile plant by use of the fruitful trick of doubling the number of chromosomes, the bearers of heredity, by means of the chemical, colchicine. This same method used on poplar, spruce, pine and basswood trees has produced several apparently new kinds, practically promising.

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ARCHAEOLOGY

Japan to Mark 2600th Birthday of Empire

JAPAN may be fighting in China and battling over trade with the United States, but that nation will take time out to celebrate the 2,600th birthday of the Japanese Empire, February 11.

To Americans facing this year the 400th anniversary of Coronado's southwest explorations and De Soto's southeast discoveries, and perplexed to pin down many of the historic details, a 2,600-year event is hard to imagine.

Japanese themselves have to take the date on faith. Earliest recorded history in Japan started in the eighth century A. D. Chroniclers then delved into tradition and boldly wrote that Japan's first emperor was enthroned in 660 B. C. and precisely on February 11. This monarch entitled Jimmu was descended from the gods, they wrote; he led his own armies in conquest personally; planted his capital at Kyoto; lived to be 127 or 137 years old; was buried in a double-mound tomb with a moat around it. Modern archaeologists have examined similar tombs of ancient Japan. A mound on the plains of Yamato where Jimmu is said to have been buried is now marked by a mausoleum.

Japanese proudly claim that the dynasty founded by this first emperor is still unbroken, rating the present Emperor Hirohito as 124th in line. To insure a successor to the throne—which must be a male—early emperors had numerous wives and it became customary for an emperor to select the male member of his house who would succeed him, as the next Son of Heaven.

Modern Japanese are made conscious of this lofty and venerable background of their Emperor by holding public holiday on Jimmu's supposed date of enthronement, which they have done since 1889. This year, says the Japanese Embassy, not only February 11, but also November 10, will be celebration days, to mark the striking, round-number date of the anniversary. Special, and extra, events of November 10 will include a very modern note—the appearance of Emperor Hirohito in front of the palace to review Boy Scouts of Japan.

Science News Letter, February 10, 1940

BIOLOGY

To Sail 40,000 Miles Among South Sea Islands

BOUND for a 40,000-mile, two-year cruise among the South Sea islands, the three-masted auxiliary schooner "Director II' sailed from New York on Thursday, Feb. 1, bearing the Second Fahnestock Expedition. The expedition will collect botanical, zoological and geological specimens, and make recordings of native ceremonials among the peoples of the islands to be visited.

Master of the ship is Sheridan Fahnestock, who navigated the first expedition's smaller craft, "Director I." In charge of scientific work is his brother, Bruce Fahnestock. They are accompanied by their mother, Mrs. Bruce Fahnestock, Sr., and a small group of scientists from the American Museum of Natural History, radio technicians, a photographer, etc.

The expedition carries a plane specially constructed for quick assembling and dismantling, which will be used for scouting and mapping and for carrying supplies to parties ashore at inland bases. The plane will also be equipped with radio for communication with the ship at all times, as well as a homing device for safety.

Science News Letter, February 10, 1940

MEDICINE

Silver Armor Provides An Aid to the Surgeon

SILVER armor, a net of tiny silver-plated rings, is an aid to surgery successfully used in Canada. A Winnipeg surgery confronted with an abdominal wall that was not sufficiently strong reenforced it with this metallic net. It did its job satisfactorily and allowed the patient, a housewife, to take up her regular daily household duties. (*Canadian Medical Association Journal, January*)

Science News Letter, February 10, 1940

IN SCIENCE

NUTRITION

War May Bring Return Of Once Popular Food

WILL the war cause a return to a food plant widely used in Europe before the eighteenth-century popularization of potatoes? The Jerusalem artichoke, tuberous-rooted relative of sunflower, may come back. When U-boats threatened to starve out England, back in 1916-17, scientists tried out various crops to see which would produce maximum of food per acre. Jerusalem artichokes won. Germans and Britons alike are now urged to eat lots of potatoes, to spare wheat reserves, but maybe the older tuber will assert itself yet.

Science News Letter, February 10, 1940

CHEMISTRY—AGRICULTURE

Gas from Apples Removes Leaves from Rose Bushes

ARTIFICIAL autumn can be brought to rose bushes, causing them to shed their leaves in a few days, by locking them up in the same room with apples, it has been discovered at Oregon State College by J. A. Milbrath, Elmer Hansen and Prof. Henry Hartman. (*Science*, Jan. 26.)

Ordinarily such defoliation would be undesirable, but when large numbers of field-grown rose bushes are being prepared for shipment to market it is necessary to rid them of their leaves, to cut down water loss through evaporation. Hand plucking is tedious and expensive, a thorny job at best.

By putting the bushes in a tightly closed, moderately heated room, with one bushel of apples to every 300 or 400 cubic feet of space, they can be caused to shed their leaves in about four days. The apples produce this effect because they give off small quantities of ethylene, which is also a common constituent of natural gas. The defoliating effect of ethylene on plants has long been known, but it has not hitherto been put to any practical use.

Large-scale results, involving the preparation of more than 200,000 rose bushes, are reported.

Science News Letter, February 10, 1940

NCE FIELDS

MEDICINE

Effect of Benzedrine Due to Action on Enzyme

BENZEDRINE, valuable remedy for narcolepsy, owes its sleep-banishing effect to its action on a body enzyme or ferment. Narcolepsy is a condition in which the victims, like Dickens' fat boy, are seized at intervals with an uncontrollable desire for sleep.

Discovery of the action of benzedrine on a body enzyme and of the chemical structure responsible for the "awakening effect" of this and similar drugs is reported by Dr. Hermann Blaschko, of Cambridge University's physiological laboratory. (*Nature,* Jan. 6.)

The sleep-banishing effect of benzedrine is due to the inhibitor action of this chemical and its derivatives on amine oxidase, Dr. Blaschko has found.

Science News Letter, February 10, 1940

ICHTHYOLOGY

Two-Headed Trout Shown at American Museum

See Front Cover

CUTHBERT THE GREAT, two-headed trout and largest fish of his class on record, has come to the American Museum of Natural History to stay. Cuthbert swims no more; he is only a preserved specimen now, but even so he is expected to attract crowds of visitors. He is pictured on the front cover of this week's SCIENCE NEWS LETTER.

Cuthbert the Great began his career as a tiny two-headed embryo fish in the Mount Shasta Fish Hatchery in California. Two-headed embryos are fairly frequent in hatcheries, but none ever survive under natural conditions. That Cuthbert lived to adult trouthood was due entirely to the care lavished upon him by a member of the hatchery staff, Elvin C. Anderson, who adopted him as an infant and brought him up "by hand."

Having two wide mouths to eat with, and only one stomach to feed, pampered Cuthbert naturally grew very fat. "By the time he was five years old, Cuthbert was the fattest fish I ever saw," states Dr. E. W. Gudger of the American Museum staff. "He even had a ring, or groove, in each of his two back-of-the-neck regions such as one finds on the neck of a fat man."

Cuthbert finally attained a length of eight inches, and a girth of seven, and he weighed eight ounces. He lived to be seven years old, a ripe old age for a trout.

An X-ray photograph discloses a short section of spinal column leading to each of the two heads, with a sort of lateral curvature of the common spine a short distance back of the point of union. In other respects the after part of the skeleton appears normal.

Science News Letter, February 10, 1940

ZOOLOGY

Swimming Pool of Liner To Have Flippered Bathers

ANTARCTIC birds and animals that require plenty of swimming water for comfort will have it for once, as a consignment from the Byrd Antarctic Expedition for the National Zoological Park prepares to move northward under the care of Keeper Malcolm Davis. The swimming pool of the one-time luxury liner *Santa Maria,* now in freight service out of South American west coast ports, will be populated with penguins, a sea leopard and other flippered fur-and-feather folk from the coasts of Antarctica instead of the bevy of languid bathing beauties who once disported themselves there.

Availability of plenty of water, and probably cakes of ice from the steamer's refrigerating plant to cool it, will help greatly in getting the heat-sensitive Antarctic animals through the troublesome tropics. This will be particularly the case with Mr. Davis' prize passenger, the ten-foot sea leopard, spotted giant relative of seals and sea lions and one of the rarest of animals ever to be seen in zoological gardens.

Among the large collection of penguins, the most distinguished is one specimen of the majestic Emperor penguin, a dignified bird more than half as tall as an average man. Most of the rest are the polite little Adélie penguins, delight of Antarctic explorers and newsreel fans.

Mr. Davis will arrive at Valparaiso on Feb. 15 with his Polar Noah's Ark, on the Byrd Expedition's supply ship *North Star.* Transfer to the *Santa Maria* will be made as quickly as possible, and the latter ship will start northward on Feb. 23.

Science News Letter, February 10, 1940

RADIO

FM for Police Use Given More Room on Air

IN THE realm of the radio ultra frequencies, where the meters almost meet the centimeters, frequency modulation — "staticless" radio — creation of pioneering Maj. Edwin H. Armstrong, is to get a little more chance at the radio ether.

The Federal Communications Commission has announced that it will entertain applications for experimental stations for such services as police, aviation, emergency services, etc, to use FM instead of amplitude modulation on wave bands above 30,000 kilocycles, already assigned for that use. It is a fertile field for this new kind of radio for there are a thousand police radio systems with more than 6,000 transmitters.

The use of FM for broadcasting, potentially one of the most exciting possibilities for the future, causing the regular broadcasters to bestir themselves and take stock, is to have hearings of the FCC beginning on Feb. 28.

Science News Letter, February 10, 1940

PHYSIOLOGY

British Nutrition Expert Gives Potato a Hand

ADVICE to Britishers in wartime from Sir John Boyd Orr, expert on nutrition, leader in the League of Nations Committee on nutrition, gives the lowly potato a hand:

After milk (and Britain has enough milk to drink a fifth more) and vegetables (and Sir John says eat twice as much) the most important food produced in the tight little isles is the potato. It is a protective food, the main source of one of the vitamins. In England an average of only 4 pounds of potatoes per week per person are eaten. Some countries eat twice as much.

"Some women are afraid to eat potatoes because they think they are fattening," remarks Sir John. "This is nonsense: 1 lb. of bread and butter is more fattening than 4 lb. of potatoes. If you think you are too fat, cut out the bread and butter and eat potatoes and vegetables. In a time of threatened food shortage, the potato is by far the most important crop, because, in addition to its special health value, it gives the highest yield of food per acre. An acre of potatoes gives twice as much food as an acre of wheat."

Science News Letter, February 10, 1940

ANTHROPOLOGY—PSYCHOLOGY

World's Oldest Joke

Radio Comics Owe a Lot to the Greeks, But for Oldest We Should Probably Have To Go Way Back to Stone Age

By EMILY C. DAVIS

SO YOU'VE heard the world's oldest joke, you think?

You turn the radio dial. The comedian is rushing to a ferry. He calls for a horse, leaps to the saddle, and rides aboard with nice sound-effect clatter.

"Hey!" yells the stooge. "Why the horse?"

"I want to get there faster!" pants the dumbbell rider.

"A chestnut!" you groan. And right you are. They laughed over that one before the fifth century A.D.

You go to a banquet. The toastmaster rises and launches into the first bright old speech of the evening. Something (maybe the dinner) reminds him, he says, of the lady whose hair was all her own—and paid for.

"I never knew he remembered Adam and Eve," you murmur to your dinner partner. You may be exaggerating. But the joke was good in the days of the Greeks.

Everybody thinks he has heard the world's oldest joke. But did you ever pin anybody down and try to find out what the world's oldest joke is?

Your correspondent has now tried. Donning gas mask, she has plunged into the dust in some pretty old volumes. Telegraph wires and phones have been busy, dragging Babylonian scholars away from their classes of students. Expeditions have been made into remote museum offices, with a reel of string to find the way out. Here is the result.

Stone Age Humor

The world's first intelligible joke was probably cracked by a Stone Age husband.

Now that can't be absolutely proved. But it can be argued with good ammunition.

Carolyn Wells, who is an authority on humor if not on ancient man, likes to imagine the Stone Age chuckling over this:

Cave Wife: Oh, come quick! Get your club! There's a sabre-tooth tiger chasing mother!

Stone Age Husband: And what the deuce do I care what happens to a sabre-tooth tiger?

Of course, nobody thinks that Europe's old cave families got off neatly clipped cracks in just our manner. But once the cave man had a language worth the name, once he got past the grunt-and-gesture stage of communication, he could have fun with words. And probably did.

Primitive folk now alive give us our best glimpse of Stone Age life, anthropologists believe. That should include humor. Eskimos, for instance, are primitive in their way. They laugh a lot. What the Eskimos laugh at may be the very sort of thing that brightened the Stone Age.

Putting the question up to Henry B. Collins, Jr., Smithsonian Institution scientist who specializes in Far Northern expeditions, yielded some clues.

Eskimo Fun

"Eskimos can see a joke," said Mr. Collins. "They can even detect overtones in an idea. They are good at plays on words—not exactly puns. They enjoy a friendly jest, and while an Eskimo can't stand being ridiculed, he gets great sport laughing at some one else. Some of their humor is sardonic."

It sounds very human. It is, says Mr. Collins.

Blunders in pronouncing English give Eskimos some good laughs. One Eskimo group, he recalls, chuckled heartily over another Eskimo's bad English:

"He goes to the store for a crankshaft and B-B shot, and they give him crackerjack and a baby shirt!"

Another day, Mr. Collins sent two Eskimos out hunting bird specimens for Smithsonian collections. He said very soberly that he would like a trumpeter swan, an Emperor goose, a Canada goose, a crane, and a white owl. The Eskimos' eyes twinkled over this tall order.

"I hope," said one quietly, "we don't see an ostrich."

Not all modern primitive peoples are equally humorous. And doubtless the Stone Age had its people who couldn't see a joke.

A mother-in-law joke may well be the world's oldest. Gilbert K. Chesterton, noted essayist, once expressed his conclusion:

"The oldest jokes are those about the most serious subjects. Being married. Being hanged."

Modern primitives, again, provide a clue to what Stone Age man thought of mother-in-law. Anthropologists studying uncivilized tribes find the mother-in-law is apt to be a conspicuous personality. Often there are rigid taboos and conventions as to proprieties of dealing with a mother-in-law. Fathers-in-law are less vivid.

No Joke Books Then

Whether we are still using Stone Age jokes we may never know. Stone Age man wrote no joke books, nor did he leave any other direct evidence of his sense of humor—at least, nothing has yet come to light.

You may laugh at the fat ladies that Stone Age sculptors turned out. But archaeologists do not think that the little Venuses, as the images are now called, were funny to Stone Age man or his wife. The images were probably for serious magic.

Sumerians, Babylonians and Egyptians, who could write, ought to have left the earliest joke books. But they so rarely wrote down anything humorous that some scholars have doubted that they went in for joking. As more is learned of these ancients, their sense of humor is now defended.

"I believe definitely that the Assyrians, Babylonians, Egyptians, and other ancient Near Eastern peoples did have a sense of humor," declared Dr. Waldo H. Dubberstein of the Oriental Institute of the University of Chicago, in response to inquiry.

"Some evidence of their sense of humor," he added, "has been preserved in their literatures. However, it is not easy for us to understand their humor, or to recognize what parts in the preserved material are intended to be in a lighter vein. The Egyptians at times certainly used puns, which, however, are practically meaningless to us and certainly not translatable. Both in Egyptian and in the cuneiform writing of Babylonia and Assyria there are obscenities which might have been amusing to the ancients."

Nobody can doubt that the following Babylonian dialog between a yes-man slave and a changeable master was meant to be funny. It is funny to read now, and it is exactly the same style of comedy that Shakespeare used in scenes between Kate and Petruchio in "The Taming of the Shrew."

A bit of the Babylonian satire goes somewhat like this:

Master: Slave, obey me.

Slave: Yes, my master, yes.

Master: I want to love a woman.

Slave: Love, my master, love! A man who loves a woman forgets pain and worry.

Master: No, slave. I don't want to love a woman, after all.

Slave: Love not, my master, love not! A woman is a pit, a hole, a ditch. Woman is a sharp iron sword which cuts off the neck of a man.

It ends by the master concluding, what's the use of it all, and deciding to kill himself and the slave; then changing his mind, as usual and saying he will kill only the slave. The yes-man gets in a last word. Still amiable, but with a neat dig, he sweetly hopes his master will live three days after him.

Ancient Gag-Lines

That the Babylonians and Assyrians had a sense of humor is also the verdict of Prof. E. A. Speiser, University of Pennsylvania specialist in Mesopotamian antiquity. He regards the master-and-slave dialog as an equivalent of our own comic gag lines. And very likely if the writers of ancient Mesopotamia had gone in for committing humor to clay tablets as painstakingly as they did their business records, historic events and didactic literature, there would be some good stories—maybe some that our own wise-crackers have missed. It is a pity that Babylonians didn't have barber-shop quips recorded. Prof. Speiser says that the barber shops were hotbeds of gossip, and many were the stories and plots circulated there, to judge by references in cuneiform writings. Some of it must have been funny.

A report that a clay tablet records the story of a Mesopotamian husband seeking his wife upstream during a flood, because she was so contrary, could not be confirmed either by Prof. Dubberstein or Prof. Speiser. Never heard of that joke in clay writings, they said.

Compared to the Stone Age or to Babylonia, Greek and Roman jokes seem scarcely old. Only 2,000 years or thereabouts; though some of the cracks that amused Athens and Rome may have actually been far older than the jokers, if we only knew the whole truth. The life expectancy of a good story is something to awe even a statistician.

Most impressive feature of Greek and Roman humor is that we still have it with us. They even laughed about the snake that bit the dowager, with a result exactly like our modern jingle:

"The man recovered from the bite,

"It was the dog that died."

Greeks and Romans liked to pin their funny stories on famous people, as we do. They told it on Diogenes the Wise that he seated himself beside a target when a very bad archer was going to shoot.

"So he won't hit me," quipped Diogenes.

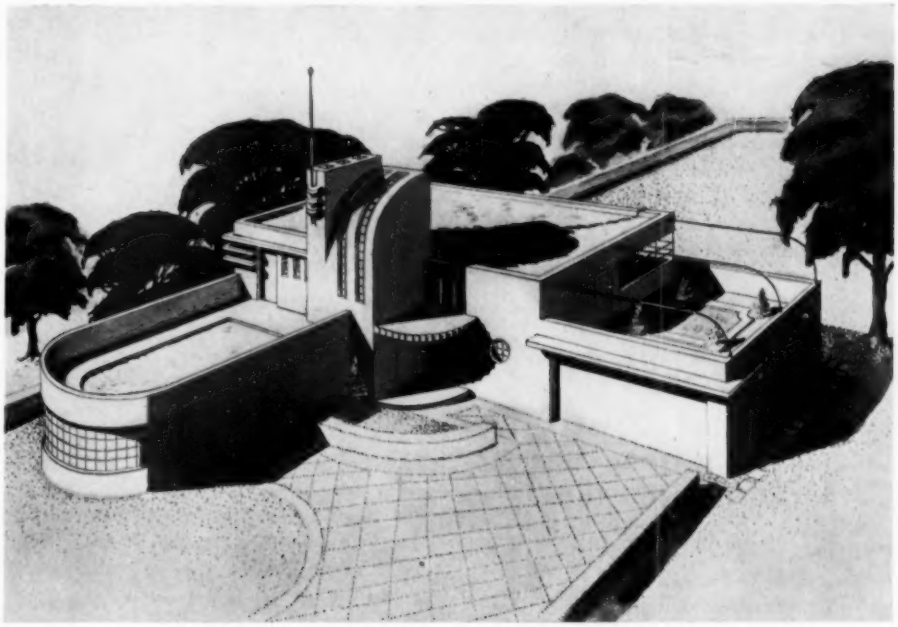
And orator Cicero, they said, was responsible for this one:

When told a certain lady was just 30 years old, Cicero nodded.

"It must be so," he agreed, "for I've heard it these 20 years."

In war, the Greeks kept up their spirits by soldier wit, some of it in Irish bull style. Soldier-historian Xenophon, describing a battle with King Croesus, for example, told of an officer briskly commanding:

"Now, Hystaspes, we want quick work; for if we kill the enemy before they kill us, not one of us will lose his life."



ROOF POOLS

Don't be surprised to see placid pools of water on rooftops of the future, and don't charge them to faulty architecture. Modern roofs will be designed with water layers upon them for insulation, turning back sun's heat in summer and reducing the escape of inside heat in winter. One pound of water evaporated dissipates 1,100 B.T.U. of the sun's heat. A new type of roof, developed by the Koppers laboratories in Pittsburgh, holds pools of water for insulation, reducing the temperature of upper stories as much as 10 degrees in summer—the equivalent of air conditioning without the cost.

Xenophon in the fourth century B.C. knew how much a jokesmith could get away with. Some of his funny stories were dragged in by the ear, the way modern comedians use far-fetched build-ups to launch a gag.

According to one Greek professor, the Greeks were "the maddest, jolliest race of men that ever inhabited our planet." At any rate, they were kind enough to write down their little jokes.

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ORNITHOLOGY

Birds Fleeing from War Gather on Swiss Lakes

BIRD refugees from Europe's war zones have gathered in the lake districts of Geneva, Neuchatel and Morat, and in the Neuchatel Jura marshes. Species not ordinarily seen in Switzerland, including heron, snipe and wild duck, are believed to have been driven out of Poland, the Rhineland and Alsace by the hostilities and by the presence of unusual numbers of men. Also in the Swiss lakes are coot, seagulls and other usual winter visitors from the Baltic.

Around the aviation training fields of England, the day-long roar of motors, and skies filled with training planes, do not seem to be disturbing the winter bird population, reports received indicate. The birds simply ignore the bigger and noisier human fliers.

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To encourage an increase in the birth rate, and to aid families, France now gives a birth premium equal to twice the father's monthly wage when the first child is born within two years after marriage, and is of French nationality.

GENERAL SCIENCE

War Most Effective Means Of Perpetuating Dictatorships

War, Says Anthropologist, Destroys Humanitarianism And Saves the Weak and Easily Intimidated Man

WAR IS the most effective means of perpetuating dictatorships, declares Harvard's epigrammatic and thought-provoking anthropologist, Dr. Earnest A. Hooton.

Taking the gloomy view that our civilization is headed toward suicide and seems determined to go that way, Dr. Hooton's latest book, "Twilight of Man" (Putnam) says:

"Anthropology has some of the right answers for human problems—or, at least, can work them out. But I do not think that most men want to know them."

That the present world may be expected to leave the dictators stronger than before, not overthown—as wishful thinking would have it—is predicted on these anthropological grounds: War gives free reign to the combative brute, suppressing humanitarianism. War destroys the most vigorous physically, "thus getting rid of the more turbulent elements and leaving as the breeding stocks those which are weaker and more easily intimidated."

Dr. Hooton's dismal conclusion that our all-but-swamped civilization actually does not wish to be rescued from headlong suicide is based on its tolerance of such conditions as crime and war.

Theoretically we hate war, he points out. But a universal and lasting peace would put the personnel of professional armies and navies out of a job, impoverish industries that profit by sale of war materials, not to mention robbing politicians and statesmen of wartime power and authority which they cannot attain in peace.

Crime, another predatory and destroying process, also flourishes because, apparently, mankind wants it that way. There is plenty of information as to the extent of crime and what it costs, says Dr. Hooton. Both are appalling. But those who profit by crime are in favor of crime. Those who are indifferent do nothing to stop it. And "no small fraction of our population makes an honest living out of the criminal activities of others."

Man's own organism, concludes Dr. Hooton sadly, is the only thing in nature that man does not want to improve. If the human race had any serious ambition in that direction, there would be today, somewhere on earth, a scientific institution for the study of human heredity big enough and well enough equipped and staffed to tackle the hard problem.

In the struggle between man's predatory and humanitarian feelings, Dr. Hooton lines up democracy on the humanitarian side, defining it as "the expression of humanitarian ideals in the government of civilized states." However, he sees democracy as a satisfactory system only when the individual citizens are intelligent enough to understand its ideals and principles and to subordinate themselves to the good of society.

"We do not have to look at recent events in Germany, Russia, and Italy to observe that deteriorated popular intelligence in nations attempting to carry on democratic forms of government makes them easy prey of dictators. That lesson has been plainly printed where he who runs may read in the histories of Latin American states for more than a century."

Refusing to regard the situation as hopeless, Dr. Hooton advises that "we go to work and try to develop a stock with a native fund of intelligence upon which we can re-build civilization and the biological future of man."

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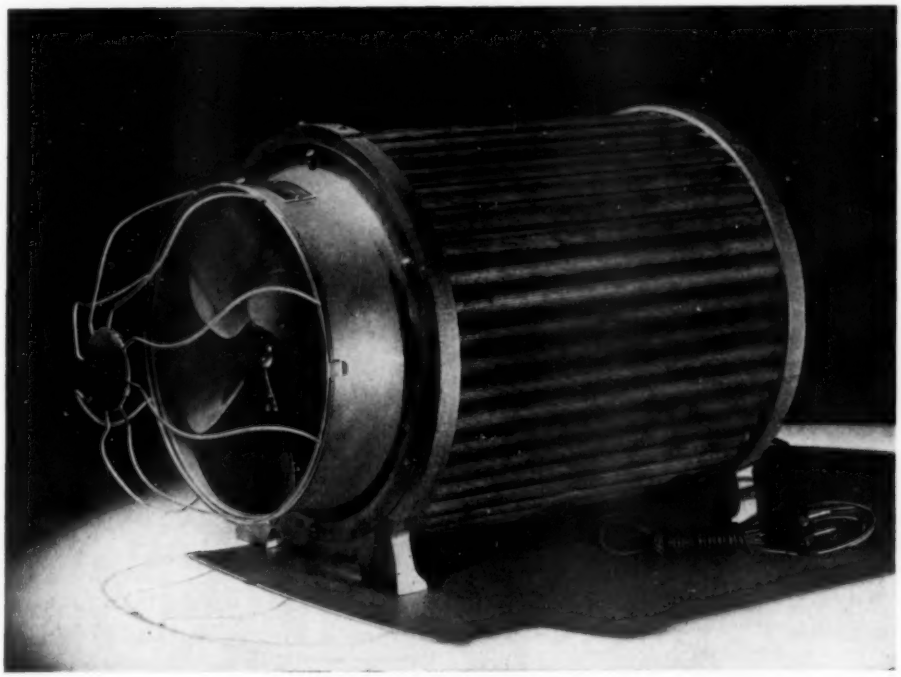
Paper manufacturers will try using a small quantity of cotton in high-quality paper, thereby providing a new outlet for low-grade cotton.



ODOR ELIMINATOR

New product of the research laboratory is this portable machine that takes odors out of the polluted air of a room. Using the principle of the ordinary gas mask, highly activated charcoal snatches out vapors, smoke and fumes—repurifies the atmosphere.

CHEMISTRY

Substitutes Help Chemists Dodge War-Scarce Items

Among Imported Items That Are Hard to Get Are Montan Wax and Ozokerite, Beeswax and All Vegetable Gums

By EDWARD ROSENDAHL

Chemist, Glyco Products Co.

ALTHOUGH the chemical industry of the United States has made tremendous strides in the last twenty years, we still depend on other countries for a number of basic products. In times of peace this dependence does not loom very large in the minds of manufacturers, but when, as at present, other countries are engaged in less peaceful pursuits and shipments are meeting with all kinds of delays, the question of replacing these products by materials produced in the United States from American raw materials, immediately becomes of utmost importance.

Among the major items imported from abroad we find that certain waxes have become scarce and very high in price. Thus, Montan Wax and Ozokerite, both of which come from Germany and neighboring countries, are, to all intents and purposes, unobtainable in this country today.

Montan Wax is used in considerable quantities in polishing preparations, paints, varnishes, roofing compositions, shoe creams, phonograph records, insulating compounds and paper sizing.

Ozokerite goes into the making of certain kinds of cosmetics, pharmaceutical ointments, wax crayons, waxed paper, textile sizings and in lithography.

Beeswax, a considerable amount of which comes from Africa, Chile and Brazil, is another wax becoming more and more expensive. Beeswax, of course, has tremendous applications in the manufacture of all types of polishes, all kinds of cosmetic preparations, chewing gum, many food products, adhesive preparations and is used in the sizing and finishing of textiles.

A glance at the current market quotations for chemical raw materials will show the words "No Prices" or "Nominal" after most waxes other than those produced in this country. Carnauba Wax (obtained from Brazil) has doubled in price in the last two months, and most of the grades are off the market. This wax is used mostly in the polish industries as well as in the making of recording disk waxes, dental waxes for impressions, cosmetics, electrical insulation and in textiles.

Vegetable gums of all types come chiefly from the Near and Far East. Transfer of boats for war purposes means delayed shipments. The same applies to shellac, which comes mostly from India.

World War Lessons

Learning lessons from the last war American chemists have been developing numerous synthetic products to replace, at least in many of their physical properties, natural materials imported from abroad. In some cases, notably in the resins and plastics field, the synthetics have proved so superior that they have replaced permanently the formerly-used natural materials.

When glycerine was almost unobtainable at almost any price a few years ago, glycerine substitutes helped cure the headaches of many a manufacturer. So good was the "cure" that after glycerine returned to normal the substitutes in many cases were retained.

Glycerine furnishes an excellent example of the fact that a substitute does not have, and need not have in many instances, the exact chemical and physical properties of a natural material.

The maker of printing press rollers uses glycerine, but he has no interest in the sweetness or color of the glycerine.

He can use a glycerine substitute that looks poor, if it has suitable properties otherwise. In contrast, a cosmetic manufacturer wants a glycerine substitute that is light in color, has "body" and is hydroscopic. Taste, in this field, matters little.

The point is that each problem of finding a substitute needs to be tackled individually. If the various substitutes in all fields, which have been created by American ingenuity and offered to American manufacturers, are tried with an open mind and with a desire to make them work, they will more than repay the time invested in them.

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PSYCHOLOGY

Rats Aid the Study of Underlying Causes of War

IN THESE WAR DAYS when bombings and poison gases and torpedoes monopolize newspaper front pages, the pitifully small expenditures in research on war prevention receive scant notice.

But at Yale's Institute of Human Relations, rats as laboratory animals are contributing to a possible eventual world peace by revealing the underlying basis of animal aggression.

These rats were taught by Dr. Neal Miller and his assistant, Miss Maritta Davis, to spar with each other in a manner natural to rats. The training was by a simple trial-and-error method—the discomfort of a mild electric shock was applied but abruptly turned off whenever one rat would cuff the other. In such a way a bad child might learn to bite or scratch to get what he wants.

When the training of the rats was completed, the turning on of the electric current was a signal for instant blows.

Next step in the research was to remove one of the sparring partners and replace it with a little celluloid doll. Now the electric current was a signal for pitching into the "innocent bystander".

This is what Freud would call "displacement." It is the same mechanism that permits hunger-ravaged, freedom-starved peoples to vent their pent-up wrath upon some scapegoat or to blame all their troubles on "international bankers," or "encircling enemies."

But it is also what the psychologist would call "transfer of training" or "generalization." Thus is bridged the wide gap between the findings of Pavlov working with salivated dogs and Freud analyzing the bizarre dreams of neurotics.

Freud's theory goes farther, however. Not only can displacement occur between one object and another superficially like it, but it can occur between one drive and another. Thus, men drinking to excess may not be driven by thirst but by fear or sex desire. People have been known to worry themselves fat, overeating in an attempt to escape from fear, Dr. Miller recalls.

His rats confirmed this theory. Trained with the assistance of Jacob Goldstein to run down an alley to drink, they would run faster when hungry than when fed. And if hungry they would run to drink even though they had been satiated on water.

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Nearly half a million birds were banded last year in the U. S. Biological Survey's efforts to study migration habits of North America's birds.

ZOOLOGY

NATURE RAMBLINGS
by Frank Thone

Vanishing Herd

BISON are being killed by the thousand at Buffalo National Park near Wainwright, Alta., in the greatest slaughter of these shaggy plains animals since the days of Buffalo Bill. The range must be cleared of all animals before spring, by order of the Canadian government at Ottawa. It is needed for other purposes, though official silence is preserved on what these purposes are. Rumor says the area is to be used as a great aviation training area, for the education of thousands of flying fighters for duty overseas.

Before the hunters began the slaughter, there were more than 3,000 bison on the range, besides 1,500 elk, 500 deer, 125 moose and 35 imported yak from Tibet. The elk are being given to Indians on reservations as they are killed, the bison carcasses will be butchered and the meat and hides sold on the market.

Wiping out of the Wainwright herd will not, of course, mean the end of bison in Canada. The largest herd of these animals in the world, some 30,000 head, are kept on a tremendous range of 17,000 square miles of wooded country, in northern Alberta and southern Mackenzie provinces.

A considerable surplus of animals from the Wainwright herd were sent to the great range some time ago, and smaller surpluses have also been distributed to other ranges and parks in Canada. Canadian conservation officials state that the range at Wainwright has deteriorated through over-grazing, so that it would be inadvisable to keep so many animals there regardless of other possible uses for the land.

The Wainwright herd had its beginnings a generation ago, when the Ca-

nadian government bought 700 head from Michael Pablo, a Mexican ranch-owner living in Montana. Mr. Pablo had built up his herd from a few survivors of the great slaughter on the Great Plains during the latter part of the nineteenth century. When the bison began to become too numerous for him, he offered his herd for sale to the United States government, but was turned down. The Canadian government then bought the 700 animals, at $250 each, and moved them to the Wainwright area, where the herd grew by natural increase to more than 3,000 head.

Before the depression, surplus animals were shipped to the great northern bison range. When shipping costs became too much for the Canadian budget, the surplus was killed and marketed. The present wholesale slaughter is being handled by a modern packing firm which secured the contract on bid.

Science News Letter, February 10, 1940

PUBLIC HEALTH—PSYCHOLOGY

War Volunteers in Canada Show Effect of Unemployment

HOW economic depression and unemployment weaken a nation's manpower is being observed in Canada these days, as the Dominion inspects thousands of volunteers who step up for war duties.

"This is not a war in which crude man-power is demanded," said Miss Charlotte Whitton, C.B.E., in an interview in Washington, D. C. Initials after her name stand for the highly coveted British honor, Commander of the Order of the British Empire, conferred by the King for Miss Whitton's work as Executive Director of the Canadian Welfare Council and her activities on social problems at League of Nations headquarters in Geneva.

"In this war," Miss Whitton continued, "it is technical skills and economic and financial contributions that are wanted. A higher range of skill and stamina is required."

Yet less than five months of this war, she said, have revealed this condition: "A solid corps of younger men who have never worked, and older men, who, unless reconditioned and trained, would not be acceptable to an army or to factories working under wartime pressures."

Canada's volunteers are coming up in far greater numbers than are immediately required. The effects of unemployment, therefore, have not given any urgent problem to military authorities—only new evidence that this machine-run war cannot expect to recruit inexhaustible supplies of men to step quickly into gaps in ranks.

Canada, with nearly two-thirds of her population in the wage earning group dependent on others for salaries, has become an industrial country to an extent very similar to that in the United States, Miss Whitton said; and many economic problems of the two countries are similar.

Science News Letter, February 10, 1940

ENGINEERING

Traffic Congestion Reduces Gasoline Mileage by Half

TRAFFIC congestion reduces gasoline mileage 50%, A. J. Bone, assistant professor of highway engineering at Massachusetts Institute of Technology, reported to the Highway Research Board of the National Research Council.

Prof. Bone has made studies in crowded down-town Boston which show that for his test car it takes seven minutes to travel a mile under ordinary conditions. Two and one-half minutes are spent waiting for traffic lights, a minute and a half is used up in low or second gear, and three minutes of time in high gear.

His average gasoline consumption in city traffic was 12.1 miles to the gallon while on Sunday mornings, with traffic interference removed, his test car could get 18.2 miles to the gallon over the same route. Thus a 50% greater gasoline consumption must be charged up to traffic.

Prof. Bone estimates that if all cars behave in a way comparable to his test car, traffic delays cost motorists some $18,000 per mile per year for the routes he studied.

In another investigation Prof. Bone tested the gasoline consumption on boulevard parkways in New York and Connecticut (Hutchinson River and Merritt Parkways) against consumption on the Boston Post Road which runs parallel to them but which has stop-lights and much traffic congestion.

He found that he could go over 20 miles to a gallon of gasoline, averaging 38 miles an hour, on the parkways while on the busy Post Road he could average only 25 miles per hour and obtained only 18.4 miles to the gallon of gasoline while doing it.

"When the proposed easterly connection between Merritt Parkway and the Boston Post Road is completed," Prof. Bone said, "an estimated saving of 40 minutes in time and 3 cents in gasoline cost will be possible on the parkways between Pelham Manor, N. Y. and Milford, Conn. (55.5 miles) compared with the shorter, but frequently congested Post Road (53.5 miles)."

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When molten bell metal is poured into a mould, it may take several weeks for the resulting bell—if a large one—to cool.

There is only a pound of bromine in seven and one-half tons of sea water, but research found a way of getting it out.

•First Glances at New Books

Medicine—Aeronautics

PRINCIPLES AND PRACTICE OF AVIATION MEDICINE—Harry G. Armstrong—*Williams and Wilkins,* 496 p., $6.50. Aviation medicine is a relatively new medical specialty but one covering an extremely wide range, as a glance through this book shows. It also concerns an increasingly large group of persons, due to increase in air travel by the general public. Flight surgeons and those engaged in research in this field will be glad to have this up-to-date book in their libraries, while the general practitioner will be glad for the ease with which he can learn from it the facts he needs to know when asked, for example, "Is it all right for me to go by plane?" or whether a plane should be used to transport a patient to a hospital. The book is not too technical to be read by pilots and aircraft designers who will find much valuable information in it, but it is rather weighty for the average lay reader.

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Electrical Engineering

ELECTRICAL ENGINEERING—E. E. Kimberly—*International Textbook,* 324 p., $2.75. This field of engineering as taught at Ohio State University. It is designed for engineering students not specifically majoring in electrical engineering in all its ramified details and aims to permit them to select proper equipment in later life, and at all times to be able to appreciate the problems of electrical engineers.

Science News Letter, February 10, 1940

Public Speaking

PUBLIC SPEAKING FOR TECHNICAL MEN —S. Marion Tucker — *McGraw-Hill,* 397 p., $3. Let us hope, ladies and gentlemen, that many of those who "give papers" will read and learn, in order that those who have to listen will have a pleasanter and more profitable time of it.

Science News Letter, February 10, 1940

History

THE BRITISH WAR BLUE BOOK, Misc. No. 9 (1939), Documents Concerning German-Polish Relations and the Outbreak of Hostilities Between Great Britain and Germany on September 3, 1939—Presented by the Secretary of State for Foreign Affairs to Parliament by Command of His Majesty—*Farrar & Rinehart,* 251 p., $1.50. The official case of the British Government in the present war. Especially striking, to the neutral reader, is the skill with which the personal idiosyncracies of the heads of the German Government are brought into the foreground.

Science News Letter, February 10, 1940

Horticulture

THREE ACRES AND A MILL — Robert Gathorne-Hardy—*Macmillan,* 361 p., $4. This book is the biography of a garden in England, which in its turn is a floristic record of the author's happy wanderings in France, Spain, Teneriffe, Iceland. It is sensitively and beautifully written; the beauty not diminished by the fact that it was all done under a cloud —the cloud of a coming war.

Science News Letter, February 10, 1940

Chemistry

A TEXT BOOK OF QUANTITATIVE INORGANIC ANALYSIS, Theory and Practice Arthur I. Vogel—*Longmans, Green,* 856 p., $5. A very comprehensive British text suitable for a chemistry major. For others it may be "tough going" but the book is one which may be used by any student as a reference for years to come.

Science News Letter, February 10, 1940

Aeronautics—Juvenile

TIMMY RIDES THE CHINA CLIPPER—Carol May — *Albert Whitman,* 94 p., $1.50. A children's book of trans-Pacific flight, telling of the adventures of Timmy Blake on such a trip. Illustrated in color, the book will appeal to the 10- and 12-year-olds.

Science News Letter, February 10, 1940

Psychology

THE SCIENCE OF PSYCHOLOGY, An Inductory Study (2d. ed.) — Raymond Holder Wheeler—*Crowell,* 436 p., $2.75. A textbook from the University of Kansas.

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Histology

HANDBOOK OF MICROSCOPIC CHARACTERISTICS OF TISSUES AND ORGANS—Karl A. Stiles—*Author, Coe College, Cedar Rapids, Iowa,* 59 p., $1.50.

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Chemistry

AN INTRODUCTION TO CHEMICAL SCIENCE—W. H. Hatcher—*Wiley,* 423 p., $3. A survey of chemistry for students other than those studying in the sciences. Used at McGill University, the book is a splendid approach for the intelligent layman as well as for students.

Science News Letter, February 10, 1940

Physics

MR. TOMPKINS IN WONDERLAND—G. Gamow—*Cambridge (Macmillan),* 91 p., $2. A top-flight theoretical physicist turns author to tell the wondrous adventures of Mr. Tompkins in a fantasy world where the laws of atomic physics affect large scale objects like you and me. Dedicated to Lewis Carroll and Niels Bohr, Nobel Prize winner, the little amusing book uses the techniques of Alice in Wonderland to make clearer the discoveries of modern physics.

Science News Letter, February 10, 1940

Political Science

THE GOVERNMENT AT YOUR SERVICE, A Handbook of Federal Help for the Citizen—Archie Robertson — *Houghton Mifflin,* 340 p., $2.75. How can I get a government pamphlet? a government loan? a government job? The thousand questions which the citizen can ask, about things to which he is legitimately entitled from the government, are answered concisely and clearly in this unique book. The author has spent some years in government service in Washington, so that he has been in position to collect information, which moreover he has taken the trouble to get authenticated by the various bureaus and agencies whose work he describes. It should be especially useful in high school classes in government.

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Anthropology

TWILIGHT OF MAN—Earnest Albert Hooton—*Putnam's,* 308 p., $3. See page 92.

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Geology

THE ORIGIN OF SUBMARINE CANYONS, A Critical Review of Hypotheses—Douglas Johnson—*Columbia Univ. Press,* 126 p., $2.50. (See SNL, Jan. 20, p. 45.)

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Physics

PHYSICS WORKBOOK—Mahlon H. Buell, Frederick W. Schuler and edited by W. R. Teeters—*Lippincott,* 378 p., $1. Teachers' Answer Key and separate unit tests furnished free to teachers ordering Physics Workbook for classroom use. Laboratory workbook for high school physics courses. The purpose is to take physics out of the realm of the abstract and show its close connection with everyday living.

Science News Letter, February 10, 1940